

Appl. No. 10/684,392
Amdt. dated March 07, 2005
Reply to Office action of February 7, 2005

Amendments to the Claims:

Claim 1 (original): A nitride light emitting device comprising:

- 5 a substrate;
 a first nitride semiconductor stack formed above the substrate, the
 first nitride semiconductor stack having an epitaxial surface and
 a first rough surface, a distance from the epitaxial surface to the
 substrate being not less than a distance from the rough surface to
10 the substrate;
 a nitride emitting layer formed on the epitaxial surface; and
 a second nitride semiconductor stack formed on the nitride emitting
 layer.

- 15 Claim 2 (currently amended): The nitride light emitting device of claim 1
 wherein the first nitride semiconductor stack comprises a nitride
 buffer layer formed on the substrate, ~~and a first nitride contact layer~~
 ~~formed on the nitride buffer layer.~~

- 20 Claim 3 (original): The nitride light emitting device of claim 1 further
 comprising a first electrode formed above a first contact area of the
 first nitride semiconductor stack.

- Claim 4 (withdrawn): The nitride light emitting device of claim 3 further
25 comprising a first transparent conductive layer formed between the
 first contact area and the first electrode.

Claim 5 (withdrawn): The nitride light emitting device of claim 3 further

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comprising a first transparent conductive layer formed on the **first** contact area and the rough surface of the first nitride semiconductor stack.

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Claim 6 (original): The nitride light emitting device of claim 3 wherein a roughness of the first contact area is not greater than a roughness of the first rough surface.

10 Claim 7 (original): The nitride light emitting device of claim 1 further comprising a reverse tunneling contact layer formed on the second nitride semiconductor stack, the reverse tunneling contact layer and the second nitride semiconductor stack being formed by opposite types of materials.

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Claim 8 (original): The nitride light emitting device of claim 7 wherein the reverse tunneling contact layer has a super lattice structure.

20 Claim 9 (original): The nitride light emitting device of claim 8 further comprising a second transparent conductive layer formed on the reverse tunneling contact layer.

25 Claim 10 (currently amended): The nitride light emitting device of claim 1 wherein the second nitride semiconductor stack has a second rough surface ~~and a second contact area~~.

Claim 11 (currently amended): The nitride light emitting device of claim 10 further comprising a second electrode formed above ~~the~~ a second contact area of the second nitride semiconductor stack.

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Claim 12 (original): The nitride light emitting device of claim 1 wherein the first rough surface of the first nitride semiconductor stack has a roughness between 3nm and 500nm.

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Claim 13 (original): The nitride light emitting device of claim 10 wherein the second rough surface of the second nitride semiconductor stack has a roughness between 3nm and 500nm.

10 Claim 14 (withdrawn): The nitride light emitting device of claim 4 wherein the first transparent conductive layer comprises at least one material selected from a group consisting of Al, Ti, Ti/Al, Cr/Al, Ti/Au, Cr/Au, Ni/Au, TiW, TiN, WSi, Au/Ge, indium tin oxide, cadmium tin oxide, antimony tin oxide, zinc aluminum oxide, and zinc tin oxide.

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Claim 15 (withdrawn): The nitride light emitting device of claim 5 wherein the first transparent conductive layer comprises at least one material selected from a group consisting of Al, Ti, Ti/Al, Cr/Al, Ti/Au, Cr/Au, Ni/Au, TiW, TiN, WSi, Au/Ge, indium tin oxide, cadmium tin oxide, antimony tin oxide, zinc aluminum oxide, and zinc tin oxide.

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Claim 16 (currently amended): The nitride light emitting device of claim 9 wherein the second transparent conductive layer comprises at least one material selected from a group consisting of Ni/Au, NiO/Au, TaA/Au, TiWN, TiN, indium tin oxide, cadmium tin oxide, antimony tin oxide, zinc aluminum oxide, and zinc tin oxide.

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Claim 17 (currently amended): The nitride light emitting device of claim 1 wherein the substrate comprises at least one material selected from a

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group consisting of sapphire, GaN, AlN, SiC, GaAs, GaP, Si, ZnO, MgO and glass.

5 Claim 18 (currently amended): The nitride light emitting device of claim 1 wherein the first nitride semiconductor stack comprises at least one material selected from a group consisting of AlN, GaN, AlGaN, InGaN, and AlInGaN.

10 Claim 19 (original): The nitride light emitting device of claim 1 wherein the nitride emitting layer comprises at least one material selected from a group consisting of AlN, GaN, AlGaN, InGaN, and AlInGaN.

15 Claim 20 (currently amended): The nitride light emitting device of claim 1 wherein the second nitride semiconductor stack comprises at least one material selected from a group consisting of AlN, GaN, AlGaN, InGaN, and AlInGaN.

20 Claim 21 (withdrawn): The nitride light emitting device of claim 2 wherein the first nitride contact layer comprises at least one material selected from a group consisting of AlN, GaN, AlGaN, InGaN, and AlInGaN.

25 Claim 22 (original): The nitride light emitting device of claim 1 wherein the first nitride semiconductor stack is N-type and the second nitride semiconductor stack is P-type.

Claim 23 (original): The nitride light emitting device of claim 1 wherein the first nitride semiconductor stack is P-type and the second nitride semiconductor stack is N-type.

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Claims 24-26 (canceled)

5 Claim 27 (currently amended): The nitride light emitting device of claim
 26 3 wherein the distance between the first contact area and the
 substrate is longer than the distance between the first rough surface
 and the substrate.

10 Claim 28 (currently amended): The nitride light emitting device of claim
 26 3 wherein the distance between the first contact area and the
 substrate is less than the distance between the first rough surface and
 the substrate.

15 Claim 29 (currently amended): The nitride light emitting device of claim
 26 3 wherein the distance between the first contact area and the
 substrate is equal to the distance between the first rough surface and
 the substrate.

20 Claims 30-34 (canceled)

 Claim 35 (currently amended): The nitride light emitting device of claim
 24 10 further comprising a reverse tunneling contact layer formed ~~on~~
 above the second nitride semiconductor stack, the reverse tunneling
25 contact layer and the second nitride semiconductor stack being formed
 by opposite types of conductivity.

 Claim 36 (original): The nitride light emitting device of claim 35 wherein
 the reverse tunneling contact layer has a super lattice structure.

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Claim 37 (currently amended): The nitride light emitting device of claim
24 10 further comprising a second transparent conductive layer formed
on above the second nitride semiconductor stack.

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Claim 38 (withdrawn): The nitride light emitting device of claim 37
wherein the second transparent conductive lay has a second electrode.

Claim 39 (currently amended): The nitride light emitting device of claim
10 24 10 wherein the second rough surface of the second nitride
semiconductor stack has a roughness between 3nm and 500nm.

Claims 40-42 (canceled)

15 Claim 43 (original): The nitride light emitting device of claim 37 wherein
the second transparent conductive layer comprises at least one
material selected from a group consisting of Ni/Au, NiO/Au, Ta/Au,
TiWN, TiN, indium tin oxide, cadmium tin oxide, antimony tin oxide,
zinc aluminum oxide, and zinc tin oxide.

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Claims 44-50 (canceled)

Claim 51 (currently amended): The nitride light emitting device of claim
24 10 wherein the first rough surface and the second rough surface is
25 are formed by performing a dry etching process.

Claim 52 (currently amended): The nitride light emitting device of claim
51 wherein the dry etching process is a sputtering etching, ion-beam
etching, plasma etching, or ~~in~~ reactive ion etching process.

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Claim 53 (currently amended): The nitride light emitting device of claim
24 10 wherein the second rough surface is an epitaxial surface.

- 5 Claim 54 (original): A method for forming a nitride light emitting device
comprising following steps:
- (a) forming a substrate;
 - (b) forming a first nitride semiconductor stack above the substrate,
the first nitride semiconductor stack having an epitaxial surface
10 and a first rough surface, a distance from the epitaxial surface to
the substrate being not less than a distance from the rough
surface to the substrate;
 - (c) forming a nitride emitting layer on the epitaxial surface; and
 - (d) forming a second nitride semiconductor stack on the nitride
15 emitting layer.

Claim 55 (currently amended): The method of claim 54 wherein step (b)
comprises forming a nitride buffer layer on the substrate, ~~and forming
a first nitride contact layer on the nitride buffer layer.~~

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Claim 56 (original): The method of claim 54 further comprising forming a
first electrode above a first contact area of the first nitride
semiconductor stack.

- 25 Claim 57 (withdrawn): The method of claim 54 further comprising forming
a first transparent conductive layer between the first contact area and
the first electrode.

Claim 58 (withdrawn): The method of claim 54 further comprising forming

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a first transparent conductive layer on the first contact area and the rough surface of the first nitride semiconductor stack.

- 5 Claim 59 (original): The method of claim 54 wherein a roughness of the first contact area is not greater than a roughness of the first rough surface.

- 10 Claim 60 (original): The method of claim 54 further comprising forming a reverse tunneling contact layer on the second nitride semiconductor stack, the reverse tunneling contact layer and the second nitride semiconductor stack being formed by opposite types of materials.

- 15 Claim 61 (original): The method of claim 60 wherein the reverse tunneling contact layer has a super lattice structure.

- 20 Claim 62 (original): The method of claim 60 further comprising forming a second transparent conductive layer on the reverse tunneling contact layer.

- 25 Claim 63 (original): The method of claim 54 further comprising forming a second rough surface and a second contact area on the second nitride semiconductor stack.

- 30 Claim 64 (original): The method of claim 63 further comprising forming a second electrode above the second contact area of the second nitride semiconductor stack.

- 35 Claim 65 (original): The method of claim 54 wherein the first rough

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surface of the first nitride semiconductor stack has a roughness between 3nm and 500nm.

- 5 Claim 66 (withdrawn): The method of claim 63 wherein the second rough surface is formed by performing a dry etching process.

Claim 67 (withdrawn): The method of claim 66 wherein the dry etching process is a sputtering etching, ion-beam etching, plasma etching, or
10 inactive ion etching process.

Claim 68 (withdrawn): The method of claim 63 wherein the second rough surface is an epitaxial surface.

- 15 Claim 69 (withdrawn): The method of claim 54 wherein the first rough surface is formed by performing a dry etching process.

Claim 70 (withdrawn): The method of claim 69 wherein the dry etching process is a sputtering etching, ion-beam etching, plasma etching, or
20 inactive ion etching process.

Claim 71 (withdrawn): The method of claim 54 wherein the first rough surface is formed by performing a wet etching process.

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